porvair sciences

Vyon® Porous Plastics

Introduction

Porvair Sciences are global leaders in the design, development and manufacture of cutting-edge porous plastics technologies. Specialising in filtration and separation of materials for biotechnology, pharmaceutical and life science industries, we deliver bespoke design and engineering expertise for a wide range of products and applications. From our UK headquarters, we work closely with our global network of customers to provide custom OEM solutions and build strong, long-lasting partnerships.

Markets We Serve

- Laboratory
- Drug Delivery
- Chromatography
- Medical and Healthcare
- Industrial

Leading Manufacturers of

Porous Plastic Materials

With patents dating back to the 1950's, Porvair Sciences continues to pioneer excellence in manufacturing and product development by evolving, adapting and responding to changes in technologies, markets and most importantly, customer needs. Empowered by 70 years of industrial experience, we strive to deliver world class, high performing products while providing superior customer service, every step of the way. Our diverse team of scientists, engineers and creative thinkers are committed to providing expert solutions that brings value and integrity to our customers.

From devices for laboratory liquid handling and sample cleanup to systems for medical diagnostics and drug delivery applications, our patented materials can be found at the heart of a wide range of innovative technologies.

1957

Vyon® porous plastic technology first developed by Porous Plastics Ltd., Dagenham. First patents using Vyon® filed globally.

1970's

Porvair PLC acquires Porous Plastic Ltd. Vyon® manufacturing relocates to King's Lynn, Norfolk.

Vyon® manufacturing site moved to Kings Lynn.

1993

Vyon® manufactured moved to current Wrexham site to be manufactured by Porvair Technology Division.

2013

Porvair Technology rebranded to be part of Porvair Filtration Group.

2018

Vyon® business incorporated into Porvair Sciences.

Manufacturing

Partnerships for Life

Combining your product with the right technology is achieved by understanding not only the requirements but the application and performance needs. All projects are assigned a key contact and team who will work closely with your company up to the point of completion. Our team is flexible in their approach enabling us to collaborate and ensure a successful project completion.

Clean Manufacturing

To help support the needs of our expanding medical and pharmaceutical customers, Porvair Sciences has a range of different clean room manufacturing options to suit requirements. Our materials are available as CERTACLEAN® for greater cleanliness and reassurance that you have the highest quality clean material for your product or application.

Precision Engineering

- Tight tolerances
- Pore size ranges
- Bespoke configurations and specifications

Centre for Quality Excellence

Our high expectation for quality, coupled with our commitment to continuous improvement, assures you that our raw materials are carefully selected, and our manufacturing processes are optimally controlled to cGMP standards. Porvair Sciences are an open company who regularly partake in audits and are ISO9001 certified.

bsi. ISO 9001 Quality Management

Regulatory Approvals

The selection of raw materials and tightly controlled manufacturing processes ensures our material conforms to several regulatory approvals. Our understanding of your regulatory requirements, deliverables and timescales ensures your product meets the markets requirements and standards and places you ahead of the competition. Vyon® porous plastics are available with a range of regulatory approvals.

- Food Drug Administration
- European Pharmacopoeia
- USP Class VI
- Food Contract
- REACH

Introducing Vyon®

Vyon® Porous Plastics

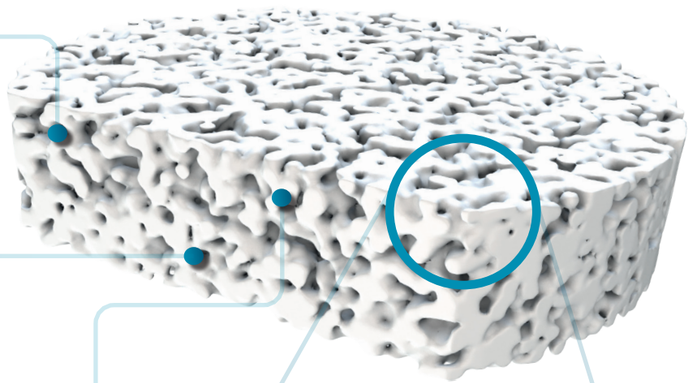
Vyon® is manufactured from virgin grade plastic polymers, polyethylene (high density and ultra-high molecular weight) and polypropylene. Proprietary sintering conditions produce porous structures composed of tortuous interconnected pathways with minimal dead-end pores. These features offer greater pore distribution, controlled flow of liquids and gases and an ability to create products ideal for filtration, separation and retention of biological and chemical materials.

From flat discs to 3D moulded structures, Vyon® is routinely manufactured into various shapes (e.g. square, round) and sizes to suit specific applications. Tightly controlled manufacturing processes ensure that materials are produced with consistent reproducible and controlled critical properties such as thickness, diameter and porosity.

Key Vyon® Characteristics

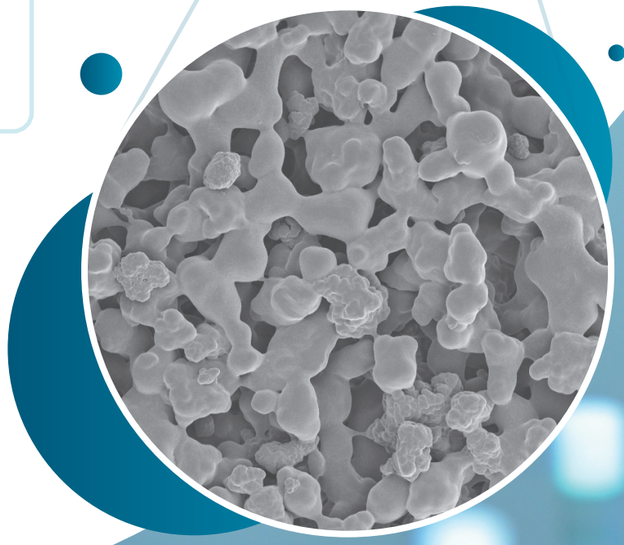
Pore Size

The size and distribution of open pores within the porous structure of Vyon® are essential characteristics influencing filtration efficiency of liquids and gases through the material.



Porosity

This is a measure of pore or void space within the porous material. Vyon® has a wide range of porosity ranging from 25% - 65% offering a suitable solution for a variety of applications such as diffusion and filtration. The porosity will have an influence on the permeability, liquid flow and the strength of sintered Vyon®.

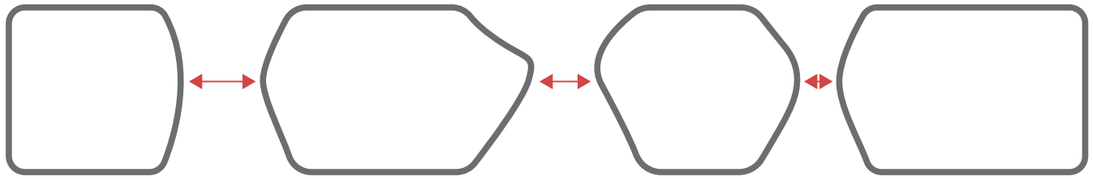


Permeability

Permeability is the capacity of a medium to transmit fluids or gases through the porous structure. This is measured by flowing a gas of known viscosity through a porous sample of known dimensions at a set rate, and measuring the pressure drop across the porous material, or by setting the gas to flow at a set pressure difference and measuring the flow rate produced. The permeability will influence both the air and liquid flow rate characteristics of Vyon®.

Pore size measurement by Porometry

Pores are filled with fluorocarbon and then expelled using compressed air. The flow measured during this process determines the pore size distribution. The pore diameter using this method is determined by the narrowest point through the pore.



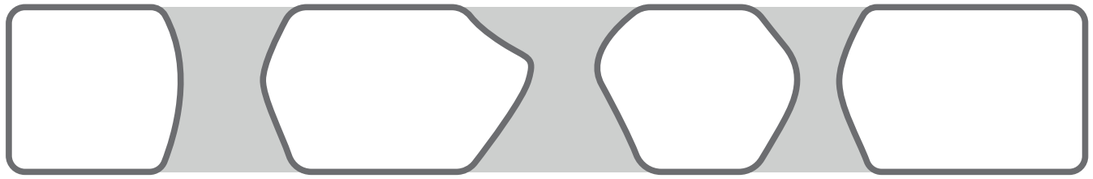
Maximum pore

Pore diameter is determined by the narrowest point through the path of the pore

Minimum pore

Pore size measured by Mercury Intrusion Porosimetry (MIP)

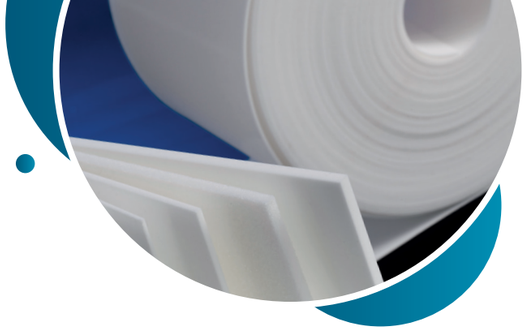
MIP is a powerful measurement tool used to evaluate pore size, porosity and the surface area of Vyon® porous plastics. A pressurised chamber is used to force mercury into a sample of Vyon®. Mercury intrudes and permeates through empty spaces (voids) filling the largest pores first.



Pore size determined by the full length and volume of the pore

The ability to tightly control these key properties enhances the performance of filtration, fluidisation, diffusion, media support, venting, absorption, silencing and wicking solutions.

Materials



Range of Vyon® Materials

Our lightweight and versatile Vyon® porous plastics are available in a variety of different thermoplastic base materials; high density polyethylene (HDPE), Ultra High Molecular Weight Polyethylene (UHMWPE) and polypropylene (PP). These base materials exhibit a range of chemical resistance, strengths, densities and thermal properties that can be manufactured to create Vyon® products to tight specifications and requirements.

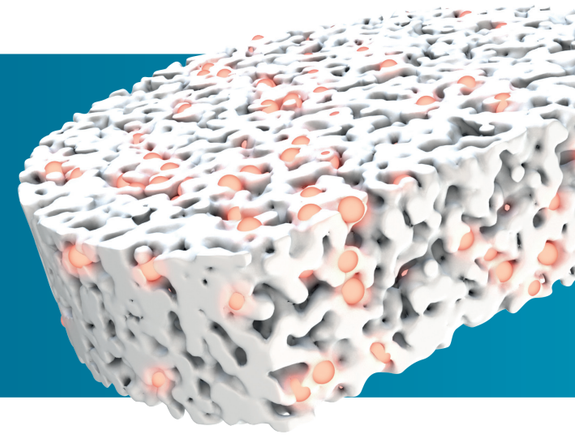
Below is an overview of the most common Vyon® materials based on popular design specification; base material, thickness and pore size.

Grade	Material	Typical Mean pore size (µm)	Available Thickness (mm)
Vyon® M	UHMWPE	7 - 10	1.50, 2.00, 3.20, 4.75, 6.00
Vyon® T	UHMWPE	10 - 18	1.00, 1.50, 2.00, 3.20
Vyon® PT	UHMWPE	10 – 30	2.80, 3.25, 3.55, 4.00
Vyon® D	HDPE	15 - 25	3.20, 4.75, 6.00
Vyon® F	HDPE	20 - 40	0.75, 1.00, 1.50, 2.00, 2.50, 3.20, 4.75, 6.00
Vyon® HP	HDPE	80 - 100	2.00, 2.50, 3.20, 4.75, 6.00
Vyon® PPD	PP	15 - 25	3.20, 4.75, 6.00
Vyon® PPF	PP	20 - 40	1.50, 2.00, 2.50, 3.20, 4.75, 6.00
Vyon® PPHP	PP	80 - 100	2.00, 2.50, 3.20, 4.75, 6.00

Note: Moulded Vyon® materials are also available in pore sizes from 1µm to > 100µm.
Please get in touch to find out at enquiries@porvairsciences.com.

Composites

Composites provide a unique ability for customers to develop blends containing chemically active agents immobilised within the Vyon® structure. Popular composites include carboxymethylcellulose (CMC) powders, SPE resins, controlled pore glass (CPG) and carbon. Products and applications using this unique hybrid technology offers advantages in pore size and controlled flow over the traditional loosely-packed systems offering marketing differentiation and benefits over traditional manufacturing processes.



Hydrophilic Treatment

HDPE & UHMWPE are naturally hydrophobic so it can be difficult for water and aqueous solutions to be absorbed into or pass through the porous structure. Through a process called plasma oxidation, the surface energy of these materials can be increased to allow them to wet out when in contact with water and other aqueous solutions. This allows liquids to be absorbed into the porous structure. Hydrophilic Vyon® is perfect for applications such as wicking, absorption and chromatography and can also be used to improve liquid passage through the structure or to enable the porous structure to act as a liquid reservoir (like a sponge).

Super Hydrophobic/Oleophobic Treatments

By plasma polymerisation, short chain fluorocarbon monomers are chemically bound to the porous surfaces of Vyon® to impart a low surface energy. This makes the material repellent to hydrocarbons and other organic molecules and importantly, is extremely repellent to water. (e.g. sterile vent and SPE filters).

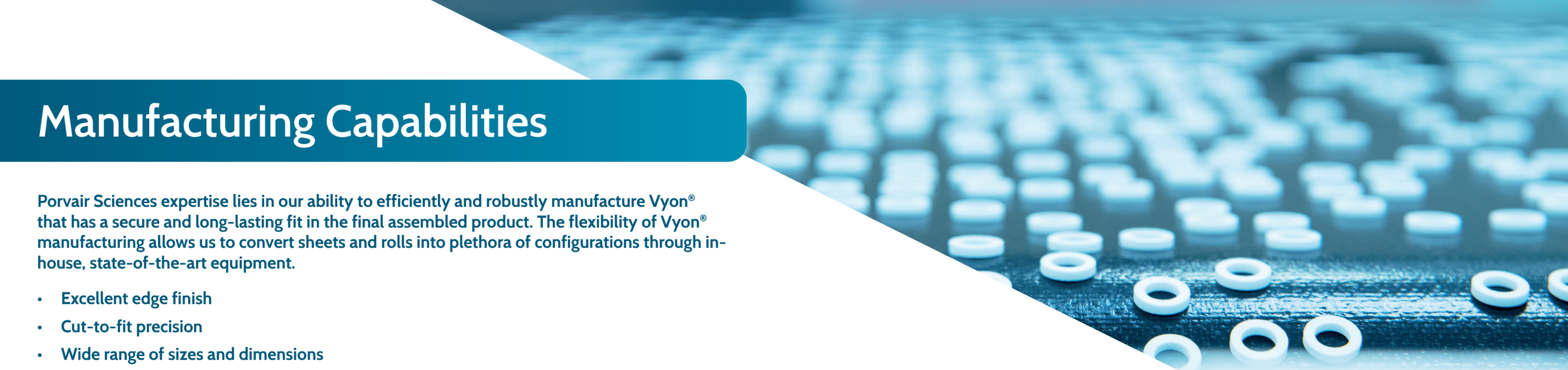
Chemical & Biological Functionalisation

Chemical anchor groups can be covalently attached to the surfaces of the pore structure either directly or using linkers, these groups can then be used to attach biomolecules such as protein A or G, peptides or other biologically active species to separate target molecules such as antibodies or chromatin from a complex sample matrix.

Ultraclean Treatment

Vyon® materials are known for their very low extractables and leachables. Vyon® can be post-treated to further reduce extractables such as short chain hydrocarbons. This is important if the frit or composite is being used in highly sensitive analyses, such as mass spectroscopy.

Manufacturing Capabilities



Porvair Sciences expertise lies in our ability to efficiently and robustly manufacture Vyon® that has a secure and long-lasting fit in the final assembled product. The flexibility of Vyon® manufacturing allows us to convert sheets and rolls into plethora of configurations through in-house, state-of-the-art equipment.

- **Excellent edge finish**
- **Cut-to-fit precision**
- **Wide range of sizes and dimensions**

Sheet and Roll

Rolls and sheets of Vyon® can be manufactured in widths over 1,050 mm wide to lengths bespoke to our customer requirements. Our standard product range of Vyon® sheets offers 1 m x 1 m sizes in many of our materials. Sheets can also be cut down to size or welded together.

Cut Discs

With single and multi-impression rotary cutters we can convert Vyon® porous plastic rolls into discs and washers. Our versatile approach means we can offer rotary cut products in diameters ranging from 3 mm to 100 mm using any of our Vyon® roll materials up to 4.75 mm thick. Our rotary cut discs have excellent edge finish, which along with their rigid material properties, makes them ideal in automated product assembly.

Mouldings

Our state-of-the-art Vyon® moulding facility allows for simple, complex and intricate component manufacture. We offer an elevated level of design from a large selection of material options. Our moulding expertise allows us to offer moulded products in varying levels of complexity; shapes may vary from simple pipette tip filters or sample preparation frits to highly complex shapes. Vyon® moulded components (2D & 3D) can be further enhanced using additives; including CMC for self-sealing properties, colours or activated compounds such as silica to create a composite frit for SPE.

Fabrications

Vyon® roll and sheet material can be fabricated to create alternative 3D shapes including cones and tubes. Tubes are expertly seam welded and can be supplied with additional features such as end caps or adaptors. These tubes can be further processed into standard or customised filter cartridges for liquid and gas filtration, sparging and other applications.

Machined Shapes

Transforming Vyon® materials into simple and complex products is no challenge for Porvair Sciences. Using temperature and humidity-controlled CNC (Computer Numerical Controlled) routing facilities offers a versatile way to create complex shapes. This machining process enables us to create clean cut products with well-defined edges ensuring a good fit into components such as industrial scale process chromatography columns and filter housings.

Punched Parts

Complex flat shapes (e.g. clover), which cannot be rotary cut, can be expertly converted with precision from Vyon® roll material using a punching method. Vyon® punched shapes exhibit the same outstanding quality as our other cut products.

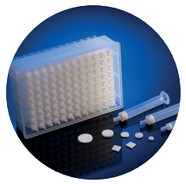
Products

At Porvair Sciences, we design and manufacture bespoke porous plastic products to meet the needs of our customers. From small high-volume pipette tip filters to large scale process chromatography bed supports, Vyon® can be found at the heart of a wide range of applications across laboratory, chromatography, medical and pharmaceutical applications. Through partnerships and collaborations, we continue to develop new, high quality innovative products that keeps you ahead of the competition while meeting regulatory and market standards.

Key Markets We Serve

Drug Delivery

- Drug delivery vents
- Inhalation device filters and diffusers
- Absorber/wicks for ophthalmic dispensing

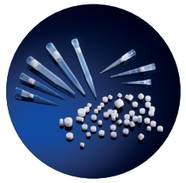


Chromatography

- Solid phase extraction frits
- Process and flash chromatography bed supports

Laboratory

- Diagnostic pipette filters
- Microplate filters
- Water purification filters
- Biological sample homogenisers

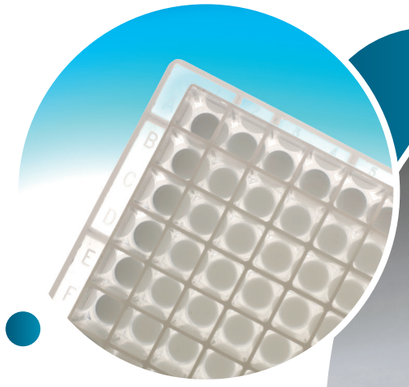


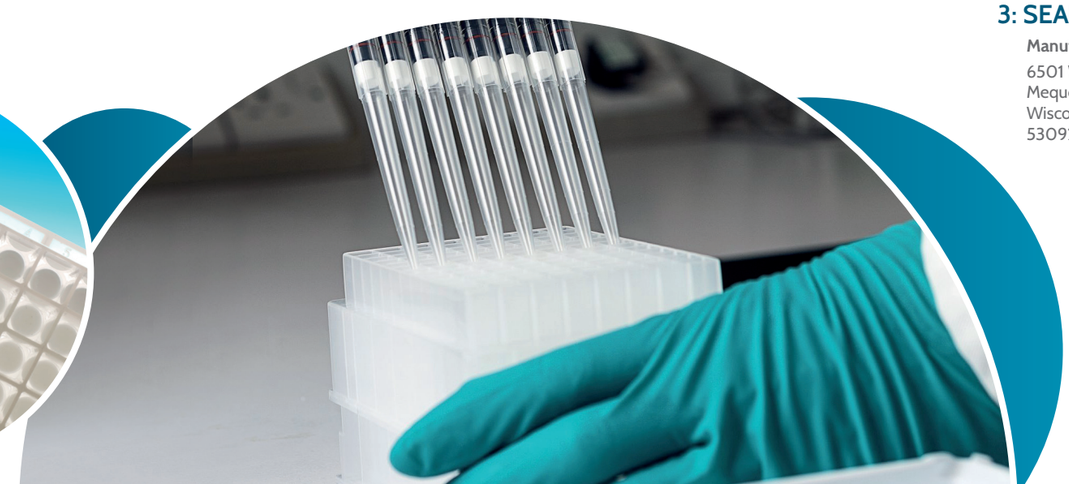
Medical and Healthcare

- Catheter vents
- Fluid collection vents
- Bone cement filters
- Media support and filters for dialysis equipment

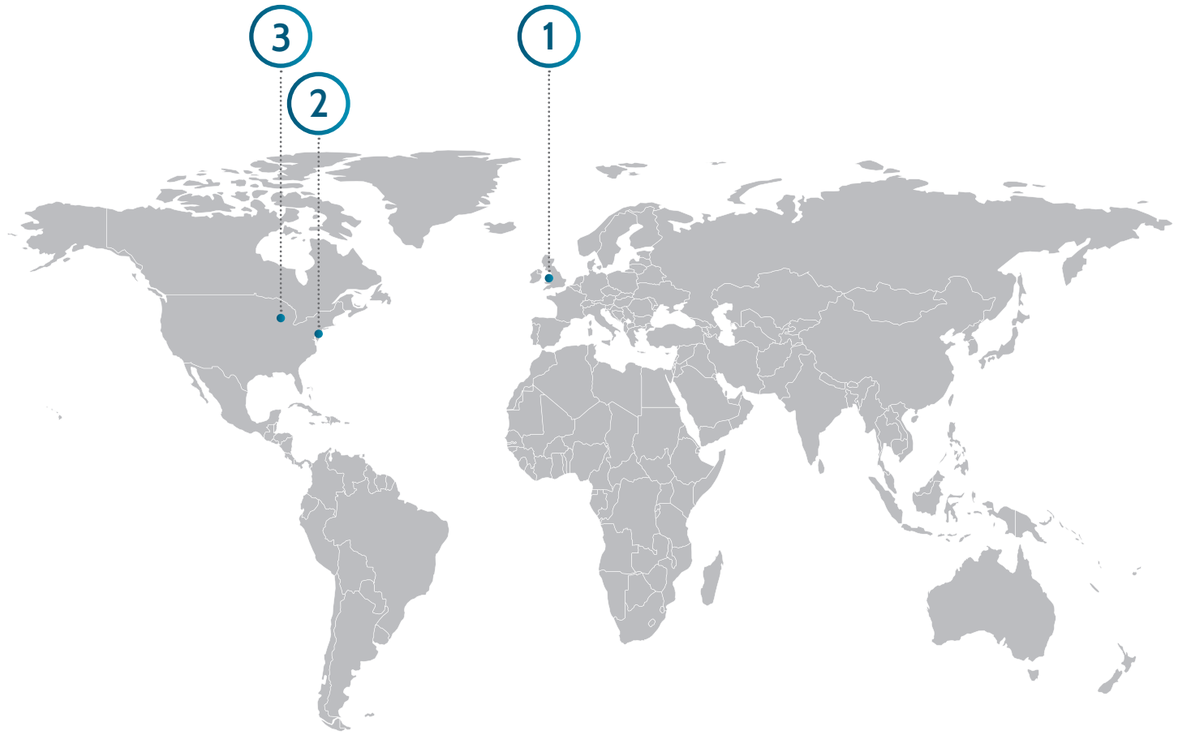
For chromatography and laboratory applications, Porvair Sciences has the unique capabilities of combining both microplate technologies with Vyon® materials to create market-leading specialised products.

To see our products, visit www.microplates.com





Porvair Sciences Laboratory Division



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Tel: 856-696-3605
Fax: 856-696-9002
Email: info@jgfinneran.com
Web: www.jgfinneran.com

3: SEAL Analytical Inc.

Manufacturers of Analysers For Environmental & Industrial Applications

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